



Neem and Tulsi leaves in growth performance of broilers

Md. Mahabubur Rahman¹, Mahbub Mostofa¹, Abu Hadi Noor Ali Khan², Nurjahan Begum³, Md. Nazrul Islam¹

¹Department of Pharmacology, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh-2202

²Department of Pathology, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh-2202

³Department of Parasitology, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh-2202

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Corresponding Author

Md. Mahabubur Rahman

✉mahabubdvm2012@gmail.com

ABSTRACT

Plant extracts have been used to improve performance and intestinal health of poultry. This study was conducted to determine the efficacy of Neem+Tulsi leaves powder as a growth promoter on the performance of broilers. One day old broiler chicks were divided into four groups, I₀, I₁, I₂ and I₃ which were supplemented with Neem+Tulsi leaves powder @ 0gm, 1gm, 2gm and 3gm/kg of broiler ration, respectively. Weekly observations were recorded for live body weight, weekly gain in weight, weekly feed consumption, feed efficiency and blood parameters of birds for six weeks. All the treatment groups I₁ (800.01±266.90), I₂ (840.01±244.00) and I₃ (864.10±230.92) recorded significantly (P<0.01) higher means for live body weight than that of control I₀ (750.39±208.10) group. All the treatment groups showed non-significant increase in weekly gain in weight, feed consumption and feed efficiency as compared to that of control group.

INTRODUCTION

The poultry production systems have led to marked increase in the production of poultry meat and eggs throughout the world (Armstrong, 1986). It has triggered the discovery and widespread use of a number of “feed additives”. The term feed additive is applied in a broad sense, to all products other than those commonly called feedstuffs, which could be added to the ration with the purpose of obtaining some special effects (Feltwell and Fox, 1979). The main objective of adding feed additives is to boost animal performance by increasing their growth rate, better-feed conversion efficiency, greater livability and lowered mortality in poultry birds. These feed additives are termed as “growth promoters” and often called as non-nutrient feed additives (Singh and Panda, 1992). Many synthetic drugs and growth promoters are supplemented to the broilers to effect rapid growth, but their use have shown many disadvantages like high cost, adverse side-effect on health of birds and long residual

properties etc. Growth promoters are chemical and biological substances, which are added to livestock food with the aim to improve the growth of chickens in fattening, improve the utilization of food and in this way realize better production and financial results. Their mechanism of action varies. Positive effect can be expressed through better appetite, improved feed conversion, stimulation of the immune system and increased vitality, regulation of the intestinal micro-flora, etc. In any case, expected results of the use of these additives are increased financial effects of production. Because of the fact that growth promoters have different mechanisms of action, it is necessary to present every group individually and present the effect, which can be expected with their utilization. With the development and wide use of synthetic and semi-synthetic antibiotics, pros and cons have been experienced throughout the last 50 years, which have been directed research back to natural antimicrobial products as indispensable resources. Consequently there is considerable research interest in the possible use

of natural products, such as essential oils and extracts of edible and medicinal plants, herbs and spices, for the development of new additives in animal feeding.

So, scientists are again concentrating on the use of our ancient medicinal system to find beneficial herbs and plants, which can be safely used to increase the production. Such plants, Neem (*Azadirachta indica*) and Tulsi (*Ocimum sanctum*) are indigenous plant of Asian subcontinent known for its useful medicinal properties since ancient times. Neem and Tulsi has attracted worldwide prominence due to its vast range of medicinal properties like antibacterial, antiviral, antifungal, antiprotozoal, hepatoprotective and various other properties without showing any adverse affects (Kale et.al., 2003). Also, Neem and Tulsi promotes growth and feed efficiency of birds Because of their antibacterial and hepatoprotective properties (Padalwar, 1994).

The neem tree *Azadirachta indica* from the family Meliaceae (Von Maydell, 1986) contains azadirachtin- a biologically active compound found in its seeds, bark and leaves (Wikipedia, 2007; Makeri et al., 2007) which is responsible for its varied medicinal uses (Schmutterer, 1990). But it is known to induce some toxic effects (Wikipedia, 2007). Neem preparations fed to laying hens have been reported by Sadre et al. (1984) and Gowda et al., (1998) to significantly reduce the content of haemoglobin, erythrocyte count and packed cell volume. Despite these findings, there is a dearth of information on the possible haematological effects of neem leaf aqueous extract in chickens of Northeastern, Nigeria. This investigation was therefore, designed to study the haematological effects of neem leaf aqueous extract in chicken, with a view to establishing its safety.

The Tulsi tree is an aromatic plant in the family Lamiaceae which is native throughout the Old World tropics and widespread as a cultivated plant and an escaped weed. *Ocimum sanctum* L., commonly known as 'Tulasi' in Tamil and holy basil in English, has been claimed to be valuable against a wide variety of diseases. Indian Materia Medica describes the use of the plant in the treatment of a number of ailments like bronchitis,

rheumatism and pyrexia (Nadkarni, 1976). Studies on the immunomodulatory effect of *O. sanctum* have been reported for various animal species (Singh et al., 1996; Sadekar et al., 1998). In Tulsi biologically active compounds have been isolated from the leaves including ursolic acid, apigenin and luteolin that activates the cell mediated immune response and therefore, creates an enhanced response to any future challenges occurred by disease organisms.

Plants are the oldest friends of mankind. They not only provide food and shelter but also serve humanity by preventing and curing different ailments. Neem and Tulsi dry leaves powder as medical herbs could be beneficial in immunosuppressant diseases of poultry. Neem and Tulsi leaves powder has immunostimulant effect that activates the cell mediated immune response and therefore, creates an enhanced response to any future challenges occurred by disease organisms. So, the feeding neem and Tulsi leaves to immunosuppressed birds increase their humoral and cell mediate immune responses (Sadekar et al., 1998). Neem and Tulsi leaves contain a vast array of chemically diverse and biologically active ingredients (Devakumar and Suktt, 1993). Low dose of Neem leaves powder have an inhibitory action on wide spectrum of microorganisms (Talwar et al., 1997) and immuomodulator actions that induce cellular immune reaction (Devakumar and Suktt, 1993). Also, Craig (1999) stated that several herbs could help providing some protection against bacteria and stimulate the immune system.

This study was aimed to evaluate the growth performance and blood parameters of broilers supplemented with Neem and Tulsi leaf powder.

MATERIALS AND METHODS

Collection and processing of plant material

Neem and Tulsi leaves were selected for effectiveness as growth promoter on poultry. Mature and disease free Neem and Tulsi leaves were collected from BAU campus.

Preparation of dust of leaves

For the preparation of dust, the leaves were dried in sun for 10 days and followed by oven at 55-60°C for 2 days. The dried leaves were pulverized with a blender. A 25 (unit) mesh diameter sieve was used to obtain the fine dust, after then dust was preserved in airtight plastic container until they were directly used for screening and preparation of alcoholic extract.

Collection and management of chickens

Broilers of one day old were randomly selected. The finally selected 40 chickens were allowed to acclimatize for 3 days in the experimental shed. The body weights (b.wt.) of assigned chickens were taken with digital weight machine and the results were recorded. During acclimatization the chicken were supplied with recommended feed and water.

Experimental design

All the 40 chicken randomly divided into 4 groups (I₀, I₁, I₂ and I₃) for assessing the efficacy of Plants leaves extract as growth promoter on broilers.

Chickens of group 'I₀': was kept as control and was not treated.

Chickens of group 'I₁': was treated with Neem+Tulsi leaf powder @ 1gm/litre by dropper for consecutive six weeks.

Chickens of group 'I₂': was treated with Neem+Tulsi leaf powder @ 2gm/litre by dropper for consecutive six weeks.

Chickens of group 'I₃': was treated with Neem+Tulsi leaf powder @ 3gm/litre by dropper for consecutive six weeks.

All the chicken of treated and control groups were closely observed for 42 days after treatment and following parameter were studied:

Clinical examination

The effect of the Neem+Tulsi leaves powder on body weight, feed consumption and water consumption was recorded before and during administration of treatment.

Chickens under trial and control groups were weighed with Electric weighing machine. The weight of each chicken was taken before feeding in the morning, in noon and afternoon. The average of these three weights was calculated and recorded. Mean live weight gain of each group of bird on 7th, 35th, and 42th days was recorded.

Hematological parameters

Blood samples were collected from neck vein of chicken of both control and treated groups at pre-feeding and during feeding (42 days) period at 7 days interval to study the effect of the Neem leaves powder. The parameter- Total erythrocyte count (TEC), Hemoglobin estimation (Hb), Packed cell volume (PCV) and Erythrocyte sedimentation rate (ESR) were observed according to the methods described by Lamberg and Rothstein (1977).

Postmortem examination for side effects

Three chickens from each group wereslaughtered to see if there were any pathological changes present on 7th day, 35th day, 42nd day of treatment. There was no significant pathological change in any internal organs of the chickens of treated groups.

Statistical analysis

The data were analyzed statistically between control and treated groups of chicken by the well know student's test ('t' test).

RESULTS AND DISCUSSION

Effect of Neem and Tulsi leaves on body weight of broiler

The average live body weight (gm) birds of I₀, I₁, I₂ and I₃ groups at six weeks post-treatment were 750.39±208.10, 800.01±266.90, 840.01±244.00 and 864.10±230.92 gm respectively. Supplementation of Neem+Tulsi leaf powder (NLP) in I₁, I₂ and I₃ groups of broilers significantly ($P<0.01$) increased the live body weights as compared to control (I₀) group (Table 1). Manwar et al. (2005) found similar results while supplemented Neem+Tulsi leaf powder @

1-2 gm/kg feed. The means weekly weight of birds of I₀, I₁, I₂ and I₃ groups were 269.20±50.04, 300.21±56.10, 331.00±55.40 and 350.30±41.61 respectively. However, it was observed that all the treatment groups of broilers showed numerically higher body weight gain as compared to control (I₀) group.

The results showed that the hematological parameter (RBC, Hb, PCV, ESR) on 21st day and 42nd day did not show any significant difference (P<0.05) between the control and treated groups (Table 2). The data also revealed low mortality rate among the birds without any vaccination programme.

Effect of Neem and Tulsi leaves on hematological parameter of broiler

Table 1: Effect of Neem and Tulsi leaves powder on body weight gain and feed consumption in broilers

Parameters	I ₀ Control	I ₁ Treatment (Neem+Tulsi) 1gm/litre	I ₂ Treatment (Neem+Tulsi) 2gm/litre	I ₃ Treatment (Neem+Tulsi) 3gm/litre
Live Body Weight	750.39±208.10	800.01±266.90**	840.01±244.00**	864.10±230.92**
Weekly gain in Weight	269.20±50.04	300.21±56.10	331.00±55.40	350.30±41.61
Feed Consumption	612.01±130.73	630.01±121.10	640.20±108.20	648.21±136.60
Feed Efficiency	0.505±0.101	0.520±0.013	0.533±0.023	0.541±0.010

Table 2: Study of neem and Tulsi leaf on hematological parameter of broiler

Days of treatment	Treatment	Mean	Std. error Mean	P value	Significance value	
21 st day	RBC	Neem+Tulsi	197.30	7.52	0.046	NS
		Control	191.33	6.35		
	Hb	Neem+Tulsi	6.46	0.06	0.02	
		Control	6.00	0.13		
	PCV	Neem+Tulsi	19.00	0.59	0.420	
		Control	16.31	0.87		
ESR	Neem+Tulsi	8.65	0.87	0.025		
	Control	10.66	0.85			
42 nd day	RBC	Neem+Tulsi	297.66	12.11	0.242	NS
		Control	248.60	13.86		
	Hb	Neem+Tulsi	7.62	0.19	0.052	
		Control	6.90	0.25		
	PCV	Neem+Tulsi	20.70	0.33	0.225	
		Control	17.00	0.59		
ESR	Neem+Tulsi	4.00	1.00	0.234		
	Control	7.00	0.59			

Supplementation of Neem and Tulsi leaves powder (NLP) in this study caused improvement in the feed efficiency as compared to that of control group. Nemade et al. (1993) reported similar observation who found highest body

weight gain and best feed conversion ratio as compared to control when offered Neem+Tulsi leaves extract to broilers from 1 to 6 weeks.

Birds supplemented with Neem and Tulsi leaves powder had higher body weight, weekly weight gain. The higher body weight gain of broiler may be due to antimicrobial and anti-protozoal properties of neem and tulsi leaves (Kale et al. 2003), which help to reduce the microbial load of birds and improved the feed consumption and feed efficiency of the birds. From the result it is clear that Tulsi @1% and 2% concentration had a high growth promoting. The study suggest that supplementation 1-3 gm of Neem and Tulsi leaves powder/kg poultry ration of treatment groups may cause significant increase in live body weight and improvement in weekly gain in weight and feed efficiency in broiler. Further studies are needed to evaluate the safe use of these plants concerning human health risk.

REFERENCES

- Armstrong DG (1986). Gut active growth promoters. Control and manipulation of animal growth. Pp.21-37.
- Craig WJ (1999). Health-promoting properties of common herbs. American journal of clinical nutrition, vol. 70, no. 3, 491s-499s.
- Devakumar C and Suktt DV (1993). Chemistry, in: randhawa, n.s. & parmar, b.s. (eds), neem research and development, publication no. 3, pp. 63-96 (India, society of pesticide science).
- Feltwell R and Fox S (1979). Practical poultry feeding. English language book society great Britain: 92-105.
- Gowda SK, Verma SVS, Elangovan AV and Singh AD (1998). Neem (*Azadirachta indica*) kernel meal in the diet of white leghorn layers. British poultry science. 39, 648-652.
- Kale BP, Kothekar MA, Tayade HP, Jaju JB and Mateeddin M (2003). Indian Journal Pharmacology, 35,177.
- Lamberg SL and Rothstein R (1977). Laboratory Manual of Hematology and Urinalysis. Avi Publishing Company, Inc., West Port, Connecticut, USSR.
- Makeri HK, Maikai VA and Nok JA (2007). Effect of topical application of neem seed (*Azadirachta indica*) extract on sheep infested with *Amblyomma variegatum*. African Journal of Biotechnology. 6(20):2324-2327.
- Nadkarni KM (1976). Nimbah. In Nadkarni (ed.), Indian Materia Medica Vol. I. 3rd edn. Bombay and Popular Prakashan Pvt. Ltd., Bombay, India: 323-325.
- Nemade PP and Kukde RJ (1993). Indian Poultry Rev. 24(1), 30-32.
- Padalwar RV (1994). M.V.Sc Thesis, Dr. P.D.K.V, Akola. Promoters in broiler production, biotechnology in animal husbandry 25 (5-6), p 387-397,
- Sadekar RD, Kolte AY, Barmase BS and Desai VF (1998). Immunopotentiating effects of *Azadirachta indica* (neem) dry leaves powder in broiler, naturally infected with IBD virus. Indian Journal of Experimental Biology, 36(11):1151-1153.
- Sadre NL, Deshpande VY, Mendulkar KN and Nandal, DH (1984). Male anti-fertility activity of *Azadirachta indica* a. Juss (neem) in different species. Pp. 473 – 482. In: schmutterer, h. Andascher, k. R. S. Eds. 1984. Natural pesticides from the neem tree (*Azadirachta indica*. A. Juss) and other tropical plants. Crc press, bocaraton, florida, U.S.A. Pp. 103- 114.
- Schmutterer H (1990). Future tasks of neem research in relation to agricultural needs worldwide. In: locke, j.c., and lawson, r.h. (eds): proceedings of a workshop on “neem’s potential in pest management programs”. USDA-ARS, Beltsville, Md. Ars-86. Pp. 15-22.
- Singh KS and Panda B (1992). Feed additives. Poultry nutrition. 2nd ed. Kalyani publ. Delhi. P. 134-143.
- Singh S, Majumdar DK and Yadav MR (1996). Chemical and pharmacological studies on fixed oil of *O. sanctum*. Indian Journal of Experimental Biology, 34: 1212–1215.
- Von Maydell HJ (1986). Trees and shrubs of the sahel, their characteristics and uses. Deutsche gesellschaft fur technisue zusammenarbeit- gtz technical report no. 399. Federal republic of Germany. Pp. 173-175.
- Wikipedia-free encyclopedia (2007) Azadirachtin .Wikipedia foundation, inc., U.S.A. Http://en.Wikipedia.org/wiki/azadirachtin